

ANOPLOZETES, A NEW GENUS OF ZETOMOTRICHIDAE (ACARIDA: CRYPTOSTIGMATA) FROM SOUTH AUSTRALIA

by DAVID C. LEE & GEORGE A. PAJAK*

Summary

LEE, D. C. & PAJAK, G. A. (1987) *Anoplozetes*, a new genus of Zetomotrichidae (Acarida: Cryptostigmata) from South Australia. *Trans. R. Soc. S. Aust.* **111**(2), 99-103, 29 May, 1987.

Anoplozetes jamiesoni gen. nov., sp. nov. is described from arid tussock grassland in the Victoria Desert, northern South Australia. The Zetomotrichinae are considered and a key provided to separate the seven genera. This is the first record of Zetomotrichidae from Australasia.

KEY WORDS: Acarida, Zetomotrichinae, new family record, *Anoplozetes jamiesoni*, new genus, new species, South Australia.

Introduction

This publication is part of an ongoing study (Lee 1981; 1982; 1985; in press) of sarcoptiform mites of South Australian soils, sampled from nine florally diverse sites. The new species described here was collected only at the arid grassland site. It is established as the type of a new genus and requires modification of the subfamily diagnosis. The Zetomotrichidae include two subfamilies of which the Rohriinae Balogh & Balogh, 1984 from Brazil are not considered. The briefness of the description of the single species of Rohriinae makes it uncertain as to whether or not some of the diagnostic character states of the Zetomotrichinae should apply to the whole family.

Materials and Methods

The notation and methods of measurements follow Lee (1981) with modifications made by Lee (in press). Measurements are in microns (μm). The trochanters are illustrated (Fig. 3), although normal, to emphasize their similarity to both those of the short-legged *Constrictobates* (Lee in press) and the saltatory *Zetomotrichus*. The mites examined are deposited in the South Australian Museum.

ZETOMOTRICHINAE Grandjean

Zetomotrichidae Grandjean, 1954: 16.

Diagnosis: Comalida. Planofissurae. Poronotae. Oripodoidea. Zetomotrichidae. Notal foramina absent, but numerous scattered refractile micropores. Soma spindle-shaped, dorsosejugal furrow

mainly absent, row of sigilla across line it would occupy. Rostral margin of proteronotum denticulate. Lamella (seta z_1 to z_2) absent. Pteromorphs absent but conspicuous tooth-shaped process bearing seta (Z_1) on hysteronotal shoulder (both directed forward) and deep limbus around lateral and posterior hysteronotal margin. Hysteronotum with 10 pairs (3J, 5Z, 2S) of setae. External malae narrow, not ventrally obscuring oral setae. Legs long, leg IV longest (femur-tarsus longer than half somal length), both tibia and tarsus IV subequal in length to femur IV, femur I and II with long stalk, tarsi I, II, III narrow proximally (subequal to distal diameter), pretarsi pedunculate with three claws.

Distribution: Previously known from two main areas: around the Mediterranean, Caspian seas and in India, and from the Andes in Peru and southward. Particular species recorded from caves, tussock grass or as saxicolous, but also known from woodland and forest litter.

Remarks: The Zetomotrichidae are unique in the Oripodoidea (=Oribatuloidea; Balogh & Balogh, 1984, see Lee in press), and unusual in the Poronotae, in lacking foramina. Although the refractile notal micropores may serve the same function, they do not appear to be homologous. Despite the absence of this diagnostic character state, the only nymphs described (Covarrubias 1969) belong to the "Excentrosclerosae" (=Oripodoidea, see Lee in press).

Balogh & Balogh (1984) record only three genera in the Zetomotrichinae and incorrectly date the authority of the name as "1934". Besides the new genus established in this paper, there are six genera recorded here in chronological order of establishment date, with references to fuller descriptions for two genera, as well as number of species and distribution:

* Div. of Natural Science, South Australian Museum, North Terrace, Adelaide, S. Aust. 5000.

- Zetomotrichus* Grandjean, 1934: One species; Algeria (Pm), ? Caucasus (Ps), Pakistan (Oi).
Mikizetes Hanimer, 1958 (Covarrubias, 1969 includes only description of immatures for the family): Two species; Argentina, Peru and Chile (NTE).
Ghilarovus Krivolulsky, 1966 (Subias & Pérez-Inigo, 1977): Three species; Spain (Pm), Uzbekistan and Turkmenia in Central Asia (Ps near Pm).
Pallidacarus Krivolulsky, 1975: One species; Turkmenia in Central Asia (Ps near Pm).
Oglasacarus Bernini, 1978: One species; Montecrista Island (Pm).
Keralotrichus Mahunka, 1985: One species; South India (Oc).

KEY TO ZETOMOTRICHINAE GENERA (Adults)

1. Notal setae Z1 & j2 similar to Z2. Pores h/2, h/5 slit-like, enlarged, twice length of seta Z2. No pyriform organ in area of pore h/3, no humeral organ or subapical process present. Coxisternal setae I2 & III2 more than twice length of I1 & III1. Genital shields bearing four setal pairs (4JZg), two pairs of paranal setae (2Sa) *Anoplozetes*
 Notal setae Z1 & j2 at least twice as long and stout as Z2, Z1 usually not setose. Pores h/2, h/5, if similarly slit-like, subequal in length to or shorter than seta Z2. Humeral organ or subapical process present, pyriform organ may be present in area of pore h/2. Coxisternal setae I2 & III2 subequal in length to or shorter than I1 & III1. Genital shields with three to five setal pairs, two or three pairs of paranal setae, but never 4JZg, 2Sa 2
2. Hysteronotal pores h/3, h/6 slit-like, subequal in length to seta Z2. Coxisternal setae I2 & III2 subequal in length to I1 & III1. Rostral margin denticulate, teeth shape similar, larger towards centre 3
 Hysteronotal pore h/6 slit-like, h/3 inconspicuous or absent, pyriform organ in similar location. Coxisternal setae I2 & III2 less than half length of enlarged I1 & III1. Rostral margin with convex apex bordered by large teeth 6
3. Genital and paranal setal formula 4JZg, 4Sa 4
 Genital and paranal setal formula 5JZg, 2Sa 5
4. Humeral process present, no humeral organ. Soma yellow brown, integument without linear sculpturing. Rostral teeth larger towards centre *Ghilarovus*
 Humeral process absent (humeral organ not known). Soma pale yellow, integument covered in parallel linear sculpturing. Rostral teeth subequal in size *Pallidacarus*
5. Humeral organ without associated larger sacculate structure *Mikizetes*
 Humeral organ with associated larger sacculate structure *Oglasacarus*

6. Genital setal formula 3JZg. Hysteronotal seta Z1 subequal in length to e1. Inner hysteronotal region framed by conspicuous line (adaxial to setae, Z1, Z2, Z4, S5, Z5, j6) *Keralotrichus*
 Genital setal formula 4JZg. Hysteronotal seta Z1 shorter than e1. No conspicuous line framing part of hysteronotum *Zetomotrichus*

The short descriptions of *Pallidacarus* and *Keralotrichus* were a drawback in constructing the key. *Pallidacarus* is assumed to be similar to *Ghilarovus*, but it would be useful to know whether or not it has a humeral organ. *Keralotrichus* can be delineated from *Zetomotrichus*, but there is a suggestion in an illustration (Mahunka 1985: Fig. 42) that it may have acetabulum IV similarly dorsal to acetabulum III, and it is, therefore, assumed here that it has character states as for *Zetomotrichus* which are associated with jumping, such as the enlarged dorsal setae on tarsus IV. The homologies of the pyriform organ, humeral organ and associated sclerite or sacculate structure need to be clearly established. The phylogenetic model held in this study is that *Anoplozetes* is primitive and *Keralotrichus* and *Zetomotrichus* are the latest derived sister group. The remaining genera apparently form an intermediate group, amongst which the similarity between the South American *Mikizetes* and the others, which are all Palaearctic genera, suggests that this group is, or has been, widespread. The loss of setae is not valuable as an indicator of derivation, different losses on the venter not being correlated, and setal losses are only occasional in the leg chaetotaxy (*Ghilarovus*, only four setae on femur II; *Zetomotrichus*, only two setae on tibia I).

Anoplozetes gen. nov.

Type species: *Anoplozetes jamiesoni* sp. nov.

Diagnosis: Zetomotrichinae. Notal setae Z1 and j2 fine, setose, similar to Z2. Hysteronotal pores h/3 and h/6 slit-like, enlarged, twice length of seta Z2. Pyriform organ in area of pore h/3 absent. Humeral organ and subapical humeral process absent. Coxisternal setae I2 and III2 at least twice length of I1 and III1. Genital shields bearing four setal pairs (4JZg). Two pairs (2Sa) of paranal setae. Tarsus IV without enlarged dorsal setae.

Remarks: Two character states previously diagnostic of Zetomotrichinae are not represented. These are the enlarged setae Z1 and j2 and the presence of either humeral organ or subapical process. Also, the derived states of the type-genus (and possibly *Keralotrichus*) associated with jumping, such as the presence of enlarged dorsal setae on tarsus IV and the positioning of acetabulum IV dorsal to acetabulum III, are absent. On the other hand, although

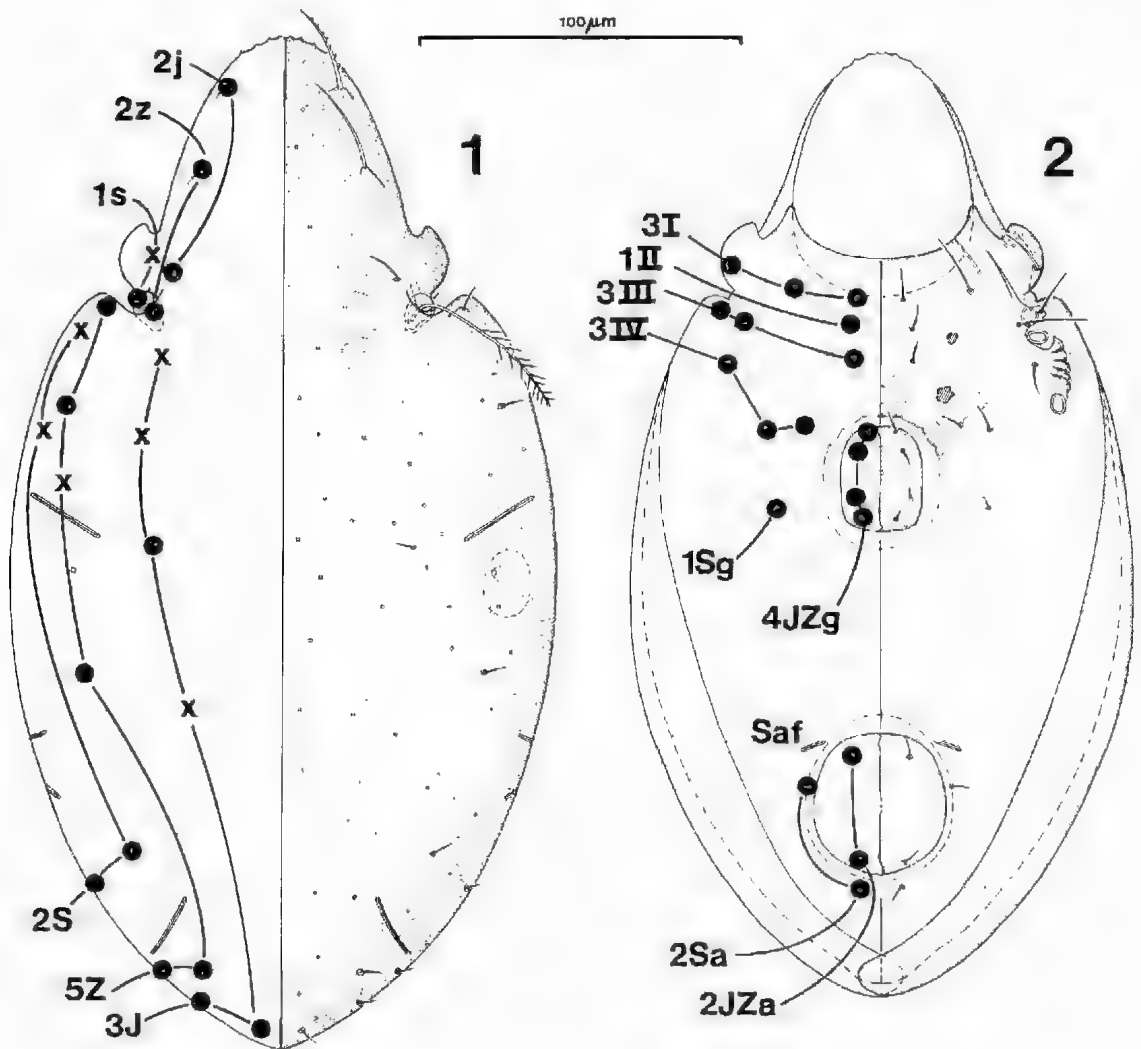
the lack of these states has been regarded (Covarubias 1969; Bernini 1978) as indicating a lack of adaptation of leg IV for jumping, it is possible that the unusual length of leg IV may be related to some ability to jump. *Anoplozetes*, lacking the derived character-states of the hysteronotal shoulder and leg IV, is considered to be the most primitive genus in Zetomotrichinae.

Anoplozetes jamiesoni sp. nov.
FIGS 1-3

Female: General appearance shiny yellow-brown, cerotegument inconspicuous, most somal setae fine

and short. Integument generally smooth, irregularly placed refractile micropores on notum, few fine striations around proteronotal seta *j*₂ and reticulations on coxisternum. Idiosomal length 323 (4, 298-344). Appendage lengths (femur-tarsus, for 333) — I 173, II 150, III 149, IV 202; tibial height — I 23, II 16, III 13, IV 16.

Prosternum with deep mentotectum, crossed laterally by longitudinal ridge. Custodium extending forward from pedotectum II, no discidium nor circumpedal ridge present. Five refractile ridges running vertically up into pleural region from between acetabulae III/IV. Coxisternal setae in 10 pairs (3III, 1II, 3III, 3IV), lateral setae longer, seta



Figs 1-2: *Anoplozetes jamiesoni* sp. nov. Fig. 1, notum of soma. Fig. 2, sternum of soma.

I2 and *III2* more than twice length of *I1* and *III1*.

Proteronotal rostral margin weakly denticulate, laterally extending backward behind level of seta *j1* (not illustrated because pointing ventrally). Without lamella between setae *z1* and *z2*, although short apodeme anterior to *z2* and weak ridge behind *z1*. Proteronotal setae in five pairs: *j1*, *z1* long and stout, *j1* with conspicuous unilateral row of cilia, *z2* long with conspicuous bilateral rows of cilia, *j2* and *s2* fine and short, with *s2* positioned ventrad to bothridium (around *z2*).

Opisthosternal shield margin (Fig. 2, broken line) extending unusually far behind anal shields and marginally overlapped by hysteronotal limbus. Chaetotaxy: 4*JZg*, 1*Sg*, 2*JZa*, 2*Sa*. On genital shield, anterior setae longer than posterior setae. Slit-like pore *Saf* almost transverse.

Hysteronotal margin with forwardly directed triangulate shoulders, elsewhere ventrally directed limbus overlapping margin of opisthosternal shield and with two posterior hyaline lobes, one overlapping the other (note Fig. 2 has no representation of hysteronotal margin with unsclerotized cuticle between it and opisthosternal shield). Chaetotaxy: 3*J*, 5*Z*, 2*S*. Two pairs of slit-like pores, *hf3* and *hf6*, over three times length of nearby setae, *hf4* and *hf5* subequal in length to such setae (not completely visible from above, see Fig. 1). Many refractile micropores scattered over surface.

Legs long, order of decreasing length IV, I, II, III, leg IV (femur-tarsus) longer than half somal length. Femora I and II with long stalk, short ventral flange bearing ventral seta on femur II. Femora III and IV with short stalk, caput large, rectangular, anteroposteriorly flattened with shallow

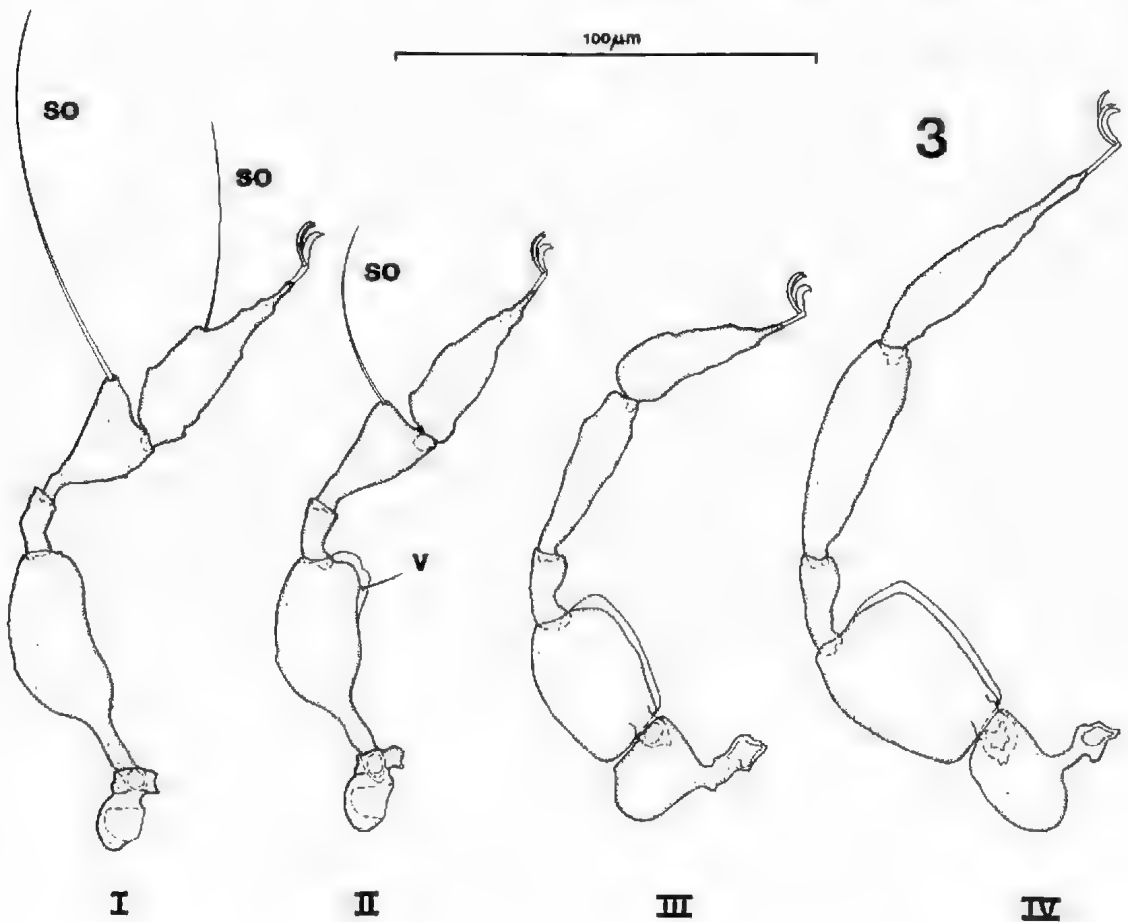


Fig. 3. *Anoplozetes jamiesoni* sp. nov., posterior aspect of right legs, showing only flagelliform solenidia and one ventral seta.

ventral flange. Tarsi long (1–1.5 × length of tibia), anterior three tarsi gradually tapering proximally to less than quarter of breadth. One long flagelliform solenidium on tibia I, II and tarsus I, other solenidia setiform or bacilliform and shorter (not illustrated, Fig. 3). Solenidiotaxy: I(1,2,2,), II(1,1,2), III(1,1,0), IV(0,1,0).

Length of finely wrinkled ovipositor tube, 129 (soma 333), including three lobes (23). Ovipositor bearing 16 setae, subequal in size to each other, all longer than coxisternal seta 12, proximal setae (*pg*) with tips reaching bases of distal setae (*dg*). Only one female with a single large oval egg (141 × 102), surface smooth. Boli may be granular, including amorphous fragments, non-septate hyaline tube fragments (?hyphae), regular minute rods (?bacilli) or spheres (?spores), and sometimes larger fungal (Deuteromycotina, ?*Alternaria*) conidia (one bolus with 26 dark brown septate conidia, 18–26 long). *Male*: As female except for measurements and spermapositor. Idiosomal length 289 (14, 258–314). Spermapositor very short, length less than greatest breadth (24), anterior-posterior axis of included bilobed sclerite 22. Spermapositor bearing 14 setae, short, subequal to each other, length about twice diameter of setal base.

Material examined: Holotype female (N1986244), three paratype females (N1986245–N1986247), 14 paratype males (N1986248–N1986261), bases of love grass (*Eragrostis eriopoda*) tussocks, near Emu (28°41'S, 132°08'E), 11.x.1974, D. C. Lée.

Distribution: Australia (Aa). South Australia, Great Victoria Desert, tussock grassland, 4 females, 14 males, in 5 of 8 × 25 cm² samples.

Remarks: This species, being the type of a monotypic genus, has diagnostic character states as for *Anoplozetes*. There is an unusually high proportion of males possibly reflecting an adaptation to the environment or that the material collected does not represent a normal population.

The species is named after Dr B. J. M. Jamieson, Queensland University, for his encouragement during the earlier stages of this project on soil mites.

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References

- BALOGH, J. & BALOGH, P. (1984) Review of the Oribatulioidea Thor, 1929 (Acari: Oribatei). *Acta zool. hung.* **30**, 257–313.
- BERNINI, F. (1978) Notulae Oribatologicae XVIII. *Oglusacarus oglasae* n. gen., n. sp., un nuovo Zetomotrichidae raccolto sull'isola di Montecristo (Acari: Oribatida). *Redia* **61**, 273–289.
- COVARRUBIAS, R. (1969) Observations sur le genre *Mikizetes* (Oribates). *Acarologia* **11**, 828–846.
- GRANDJEAN, F. (1934) Oribates de l'Afrique du Nord (2e série). *Bull. Soc. Hist. Nat. Afr. Nord* **25**, 235–252.
- (1954) *Zetomotrichus lacrimans*, Acarien sauteur (Oribate) (Acari: Zetomotrichidae). *Ann. Soc. Entomol. France* **123**, 1–16.
- HANMER, M. (1958) Investigations on the Oribatid fauna of the Andes Mountains. I. The Argentine and Bolivia. *Biol. Skr. Dan. Vid. Selsk.* **10**, 1–129.
- KRIVOLUTSKY, D. A. (1966) O pantsirnykh klechichah (Oribatei, Acariformes) poich srednei Asii. *Zool. Zh.* **45**, 1628–1638.
- (1975) Zetomotrichidae. In: Ghilarov M. S. & Krivolutsky D. A. (Eds). *Opredelitel obitaouchik v pochve klechichi*. (Nauka, Moscow).
- LEE, D. C. (1981) Sarcopliiformes (Acari) of South Australian soils. 1. Notation. 2. Bifemorata and Ptyctima (Cryptostigmata). *Rec. S. Aust. Mus.* **18**, 199–222.
- (1982) Sarcopliiformes (Acari) of South Australian soils. 3. Arthronotina (Cryptostigmata). *Ibid* **18**, 327–359.
- (1985) Sarcopliiformes (Acari) of South Australian soils. 4. Primitive oribatid mites (Cryptostigmata) with an extensive, unfissured hysteronotal shield and aptychoid. *Ibid* **19**, 39–67.
- (in press) Introductory study of advanced oribatid mites (Acari: Cryptostigmata: Planofissurinae) and a redescription of the only valid species of *Constrictobates* (Oribatoidea). *Ibid* **21**.
- MAHUNKA, S. (1985) Neue und interessante Milben aus dem Genfer Museum. I.V. Oribatids from South India I (Acari: Oribatida). *Revue suisse Zool.* **92**, 367–383.
- SUBIAS, L. S. & PÉREZ-INIGO, C. (1977) Notes sur les Oribates d'Espagne. 1. Description de *Ghilarovius hispanicus* n. sp. et quelques considérations sur les Zetomotrichidae (Acari, Oribatei). *Acarologia* **18**, 729–739.